UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,617	03/22/2001	Magnus Johansson	S1022/8574	8085

7590 01/04/2005

James H Morris
Wolf Greenfield & Sacks
Federal Reserve Plaza
600 Atlantic Avenue
Boston, MA 02210-2211

EXAMINER	
CHANG, EDITH M	

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/700,617	JOHANSSON ET AL.	
	Examiner	Art Unit	
	Edith M Chang	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *111700*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore,

In claim 1, the "a sampling clock" and "ambiguity prevention means" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In claim 3, "said sampling clock is controlled using an estimate of said frame argument functions' slope" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In claim 43, "a sampling clock" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. The drawings are objected to because in Figure 1,

there are arrow connections between "equalization parameter updating algorithm" and "sampling clock control algorithm", does it means that there is information exchanging between these two elements.

There is a connection between "detector (quantizer)" and the first connection between "equalization parameter updating algorithm" and "sampling clock control algorithm", does it means that the "detector(quantizer)" takes the signal on the first connection as input.

The same applies to the connection between the symbol detector and the second connection between "equalization parameter updating algorithm" and "sampling clock control algorithm", does it means that the "symbol decoder" takes the signal on the second line as input.

The "Y" is the output of "detector (quantizer)" or the input of "symbol decoder".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.

Replace the abstract with a new abstract with a single paragraph within the range of 50 to 150 words.

4. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(e) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(f) BRIEF SUMMARY OF THE INVENTION.
(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(h) DETAILED DESCRIPTION OF THE INVENTION.
(i) CLAIM OR CLAIMS (commencing on a separate sheet).
(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

5. For the formality of the application under the present office practice, applicant(s) is required to replace "Claims" with "I or We Claim", "The Invention Claimed Is" (or the equivalent) before the Claims part of the specification of the instant application. See MPEP 608.01(m).

Claim Objections

6. Claims 2-20, 22, 24-42, 46 and 48 are objected to because of the following informalities:

Claims 2-20 & Claims 24-42, line 1: "A" is suggested changing to "The".

Claim 3, line 2: "OFDM" is suggested changing to "OFDM transmission".

Claims 17-20 & Claims 39-42, line 1: "OFDM" is suggested changing to "OFDM transmission".

Claim 22, line 1: "an" is suggested changing to "the"; and line 2: "a" is suggested changing to "the".

Claims 25, line 2: "OFDM" is suggested changing to "OFDM transmission".

Claim 46, line 2: "adaptive" is suggested changing to "an adaptive"; line 4: "comprising" is suggested changing to "the method comprising".

Claim 48, line 1: "a" is suggested changing to "the".

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 43-45 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In claim 43, lines 9-10: "the equalization controller including an ambiguity prevention mechanism" does not described as what described in the specification page 2 lines 8-9 wherein "a sampling clock control means characterized in that ambiguity prevention means are provided".

Claims 44 and 45 are depend on the rejected claim 43.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-42 and 44-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4: "time differences" lacks antecedent basis, what are these "time differences". It does not clearly indicate the "time differences" regarding the invention of the claim 1.

Claim 2, line 2: "an equalized data stream" does not clearly indicate its connection to the means comprised in the receiver. It is derived from equalizer, detector or any other element of the receiver, or it is an independent data stream called "equalized data stream" by itself.

Claim 3, line 1: "wherein sampling time deviations" does not clearly indicate what are they. In claim 1, "time differences" is cited, what is the relation between them; line 2: "received frame argument functions" are undefined to have a linear slope.

Claim 4 & Claim 26, line 3: "an equalizer parameter argument function" is undefined. In the teaching of the application, there are the output of the equalizer/adaptive channel equalizer

means EQ, the unwrapped argument function of EQ, and the unwrapped equalizer parameter argument function ∠EQ. The "an equalizer parameter argument function" is not clearly indicate what is the "an equalizer parameter argument function" regarding the invention.

Claims 5 & Claim 27, lines 1-2: "said sampling clock's frequency" lacks antecedent basis; lines 2-3: "an argument function" is undefined, it is another argument function, or has any relation to the "an equalizer parameter argument function" recited in claim 4; line 3: what is the relation of "an equalizer" to the "an adaptive channel equalization means" recited in claim 1/claim 26, or it is another element further comprised in the receiver.

Claim 8 & Claim 30, the "EQ" in the equation is not defined.

Claim 9 & Claim 31, line 2: "the received signal" lacks antecedent basis.

Claims 12-14 & Claims 34-36, lines 1-2: "wherein an equalizer parameter vector EQ" is undefined; and "X", "μ_1", "μ_2", "μ_3" in the equation (3a), (3b) and (3c) respectively is undefined; and lines 1-2: "wherein an equalizer parameter vector" does not match the "an equalizer output vector" cited in claim 5/claim 27, or the "an equalizer parameter vector" is another vector.

Claim 16 & Claim 38, lines 2-3: "the adaptive equaliser parameter vector" is not matched to (or indicated as) the "an equaliser parameter vector" cited in claim 13/claim 34 or "an equalizer output vector" cited in claim 5/claim 27.

Claim 23, the claim cites a transmitter with a sampling clock, and a receiver with a sampling clock, a sampling clock control means and an adaptive channel equalizer means in an OFDM transmission system, a method of maintaining synchronizations between said receiver sampling clock and said transmitter sampling clock. Then continues with "wherein said adaptive

channel equalizer means", it does not clearly indicate that the claim is an apparatus claim with the structure of comprised elements or a method claim with comprised steps to accomplish the "maintaining synchronizations".

Claim 24, line 2: "said sampling clock" does not indicate clearly which sampling clock, there are a "said sampling clock" of the receiver and a "said sampling clock" of the transmitter.

Claim 25, line 2: "received frame argument functions" does not indicate clearly where these frame argument functions received from; and line 3: "said sampling clock" does not indicate clearly which sampling clock, there are a "said sampling clock" of the receiver and a "said sampling clock" of the transmitter.

Claim 44, lines 2-3: "an equalizer parameter argument function" is undefined. In the teaching of the application, there are the output of the equalizer/adaptive channel equalizer means EQ, the unwrapped argument function of EQ, and the unwrapped equalizer parameter argument function $\angle$EQ. The "an equalizer parameter argument function" is not clearly indicate what is the "an equalizer parameter argument function" regarding the invention; and in claims 43 there are "an adaptive channel equalizer" and "an equalization controller including an ambiguity prevention mechanism", it does not clearly indicate the "an equalizer parameter argument function" related to (or provided by/derived from) which element.

Claim 46, line 3: "a method" does not clearly indicate which part (receiver or transmitter) of the system includes the method.

Claim 47, line 3: "an equalizer parameter argument function" is undefined. In the teaching of the application, there are the output of the equalizer/adaptive channel equalizer

means EQ, the unwrapped argument function of EQ, and the unwrapped equalizer parameter argument function ∠EQ.

Claims 6-7, 10-11, 15, 17-22, 28-29, 32, 33, 37, 39-42, 45 and 48 are directly or indirectly dependent on rejected claims 1, 24, 44 and 46.

11. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. In claim 1, the omitted elements are: "*detector* (quantizer)" and "*equalization parameter updating means*/algorithm" in Figure 1. The "equalization parameter updating means/algorithm" takes outputs from the "detector" and "adaptive channel equalizer means (equaliser)" to provide the equalizer parameter (EQ) to the "adaptive channel equalizer means (equaliser)" so to prevent the "adaptive channel equalizer means (equaliser)" from operating on time differences which should be corrected by operation of the "sampling clock control means". Omission of "detector" and "equalization parameter updating means" amounts to a gap between the elements of the receiver and cant not complete the invention cited in the claim.

Claims 2-22 are directly or indirectly dependent on rejected claim 1.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1-4, 17-26, 39-44, 46-47 and 49 are rejected under 35 U.S.C. 102(e) as being anticipated by Olsson et al. (US 6,625,112 B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

To claims 1, 23 & 46, in FIG.1 and column 1 lines 5-13, Olsson teaches a receiver and its method of maintaining synchronization in an OFDM transmission system having transmitter and receiver, wherein the receiver having an equalizer (an adaptive channel equalizer means of FIG.1), a sampling clock (receiving the sampling clock oscillator control from the sampling clock control algorithm element of FIG.1), and a sampling clock control algorithm element (the sampling clock control means of FIG.1). Wherein an ambiguity prevention mechanism/means (column 2 lines 41-45) provides the synchronization of the frame in the equalization stage without the time differences which are corrected by the sampling clock control means (in FIG.1, the output of the equalization parameter updating algorithm input to the sampling clock control algorithm to correct the time difference/the sampling clock).

To claims 2 & 24, in FIG.1, Olsson teaches the sampling clock receives the control derived from the equalized data stream U from the sampling control algorithm element.

To claims 3-4, 25-26, 44 & 47, column 4 lines 1-5, Olsson teaches an estimate slope of an argument function being (close to) zero to synchronize the frames of the OFDM signal.

To claims 17 & 39, in column 1 lines 14-16, Olsson teaches the OFDM employs DMT.

To claims 18-20 & 40-42, in column 2 lines 58-63, Olsson teaches the OFDM system is an ADSL, VDSL, and a mobile system.

To claims 21 & 22, in column 2 lines 32-33 & lines 58-63, Olsson teaches an OFDM multi-carrier system with ADSL/VDSL modems which inherently provides at least one transmitter and a plurality of receivers. The modem is the transceiver.

To claims 43 & 49, in FIG.1 and column 1 lines 5-13, Olsson teaches a receiver and its method of maintaining synchronization in an OFDM transmission system having transmitter and receiver, wherein the receiver having

an equalizer (an adaptive channel equalizer means of FIG.1) for receiving the input data X in frequency domain (column 3 line 25) and producing U an equalized signal;

a detector (quantizer) qunatizing the signal U to produce a quantized signal Y;

a sampling clock (receiving the sampling clock oscillator control from the sampling clock control algorithm element of FIG.1);

a sampling clock control algorithm element (the sampling clock control means of FIG.1) providing the sampling clock oscillator control according to the output of the equalisation parameter updating algorithm element which receives the equalized signal U and the quantized signal Y as inputs; and

an equalisation parameter updating algorithm element (an equalization controller) controls the equaliser according to the U, Y, and X which are inputs to the equalisation parameter updating algorithm element. Wherein an ambiguity prevention mechanism/means (column 2 lines 41-45) provides the synchronization of the frame in the equalization stage

without the time differences which are corrected by the sampling clock control means (in FIG.1, the output of the equalization parameter updating algorithm input to the sampling clock control algorithm to correct the time difference/the sampling clock).

Allowable Subject Matter

14. Claims 5-16, 27-38 and 48 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach or suggest, alone or in a combination, among other things, at least a OFDM receiver and its method as a whole, the combination of elements and features, which includes a slope of an equalizer parameter argument function of element-by-element product of the vector of the equalized signal from the equalizer and the conjugate of the vector of the quantized signal from the decoder (quantizer) or an average slope derived from the unwrapped equalizer parameter argument function of the equalized signal from the equalizer to provide the synchronization.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
December 21, 2004

YOUNG T. TSE
PRIMARY EXAMINER